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Van Bastelaer, Béatrice; Lobet-Maris, Claire

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Development Models for Virtual Cities ⁽¹⁾

Claire LOBET-MARIS
& Béatrice van BASTELAER

CITA, Facultés Universitaires Notre-Dame de la Paix de Namur

■ Introduction

In the late 20th and early 21st centuries, cities are becoming increasingly concerned, whether directly or remotely, with the development of information and communications technologies. France and Belgium by no means constitute exceptions in the matter. The number of websites created by communities or local administrative units continues to grow ⁽²⁾. The question, then, as Yves Auton points out, is to discern whether the world wide network can serve as a tool for local development.

These diverse realities constitute what is generally referred to as virtual or cyber cities, a term which can have many, often disparate, meanings. In fact, there exists no single definition for this concept, and authors rarely attribute it a strictly identical significance. This concept is used at once to qualify the rapid development of information and communications technologies which are now transforming industrial cities, as well as when referring to on-line services, those services which are primarily available on

COMMUNICATIONS & STRATEGIES, no. 39, 3rd quarter 2000, p. 59.

(1) These studies were performed in the context of the SLIM project (Social Learning in Multimedia) within the DG XII's Targeted Socio-Economic Research programme. Four of these studies were published recently in van BASTELAER, HENIN & LOBET-MARIS (2000), ISBN 2-7384-9293-2.

(2) For France, refer, notably to studies by Gérard LOISEAU (1998) or the directory of local world websites (*l'annuaire des sites du monde local*) compiled by the Crédit local de France (http://enligne.clf.fr/page/service_plus/annuaire/baro.htm). For Belgium, refer to van BASTELAER (1999), pp. 37-56 and STEYAERT (1999).

the Net and managed by local administrative bodies, companies, citizens or users, and which offer either local content or use the urban metaphor to facilitate users' understanding.

The development of new technologies at the local level is rife with lessons in terms of both research and practice. This development is by no means recent, however: virtual cities perpetuate the trend created by free radio and community television in the 1960s and 1970s, as well as the first cyber communities ⁽³⁾. They present a number of similarities with the cabled city projects mounted in the 1970s, and fall into the broader scale projects of electronic public services and on-line administration.

Virtual cities represent an interesting field of analysis and observation as they can be perceived as a laboratory for studying the development of information and communications technologies, their impact on local administration as well as on citizens and local communities. For Emmanuel EVENO (1997), a French specialist in the virtual cities' inherent issues, communication in a metropolis holds a particular significance which is linked to the very definition of the city itself. Cities are places, spaces where people come together and communicate. According to Eveno, these are both practical and symbolic needs. Cities are laboratories for the future communication society even if, for the author, this concept is tautological: communication founds the society and information is crucial to its existence.

■ Development Models

One of the questions which motivated us in the study and analysis of virtual cities concerns development models. By development models, we are referring to the manner in which the various players involved in the development of these virtual cities undertake to manage the uncertainties which are inherent in this type of project. It also consists in assessing whether these cities are developing according to divergent trajectories, divergent patterns reflective of their context, their objectives and of the players working to develop them, and in defining which elements serve to characterise these models. In addition to the purely theoretical interest that

(3) For further details of this aspect, refer to VAN BASTELAER Béatrice (2000), "Chapitre 1. Les villes virtuelles: définition et historique", in VAN BASTELAER Béatrice, HENIN Laurent & LOBET-MARIS Claire (2000), pp. 17-32.

this question holds, this analysis may also be empirical in scope, in terms of an element for assessing the project, notably with respect to its objectives. We will come back to this later.

Based on these cases and the existing literature, we have established three typical development models: the blueprint model, the experimental model and, lastly, the open model. These models further the traditional vision of the top-down or bottom-up approaches. They aim to reduce a certain number of uncertainties linked with the development of these cities and, more specifically perhaps, some of the difficulties in managing these projects.

A response to management issues

The observation of different cases of virtual cities brings to the fore a number of management issues such as the instability of technologies, users' involvement in the project's development and the virtual city's borders.

The instability of technologies

Information and communications technologies, and particularly multimedia, are characterised by the frequent changes they undergo, in terms of both hardware and software. This constant evolution often gives the impression of a whirlwind, or a din. People are quick to get the sense that their knowledge of technology, and even of their own equipment, is outdated, and they must buy new or adapt their existing products for fear of being left behind.

Faced with this perpetual change, two main strategies can be observed. The first consists in keeping pace with the movement, in constantly adapting the technology or the applications in order to be on board with the latest developments. In the second strategy, which no doubt corresponds best to administrative practices reflective of the sluggishness of procedures and budgetary restrictions, the tendency is to attempt to make the most viable choices which, in the technological context described here above, involves making the most educated guess possible with respect to the future evolution of technologies. While the initial choice is sometimes justified after several years' time, the prediction could be entirely erroneous as evolution does not take the expected course. Here then, precious resources are wasted.

Each of these solutions, which we may consider as being two extremes of a continuum, has both its advantages and disadvantages. The central issue is to know how to reconcile stability and flexibility, short term and long term, economic arguments and stable investments. According to the *Observatoire des télécommunications dans la ville* (Observatory of telecommunications in the city) (1997), every decision must be guided by the desire to develop an infrastructure which will evolve over time, in other words which is capable of rapid integration of equipment evolution and the emergence of new technologies.

User involvement

The issue of user involvement is as interesting at a theoretical as at a practical level. Users constitute a great unknown in the field of information and communications technologies: what are their needs, how to design products which best suit their needs, what real use do users make of these technologies, etc.?

In the cases observed, apart from a few exceptions, users remain absent from the development of these projects and, paradoxically, from concrete use of them. In fact, the stage of stimulating use, via appropriate training, equipment offerings and the development of public access areas, remains largely neglected in the majority of the cases observed. Theoretically, the sites are developed for users, albeit most frequently without them, especially when elected officials or local administrations are involved. As Jo STEYAERT (1999) reveals in a study on the development of virtual cities in Flanders, these cities are rather "virtual islands" which are primarily occupied by administrations and very little by the citizens themselves, even though these latter are presented as being the targeted users.

The virtual city's borders

As was pointed out above, a reading of the literature concerning virtual cities reveals the lack of a single definition for this concept. In the same manner, existing cases reveal a diversity of situations and certain tensions between the perspectives of the Community and the City. The notion of Community refers to a body of individuals who come together, often around a common theme, and sometimes because they inhabit a same place. In this case, the virtual city is a reflection of the various components of the community and allows its members to express themselves in many ways (e-mail, website development, chat forums, etc.) and to share their points of view. The notion of the City mirrors the more administrative concept of the

metropolis. The city is thus presented more in terms of its administration and the services it offers; the notions of association or community are therefore of lesser importance.

These questions give rise to the theme of the city's sociological frontiers. Hence, certain virtual cities seem to adhere to traditional sociological borders by being very clearly grounded locally, as much in terms of information as of users. Others, however, eradicate these borders completely. By eradication, we are not referring to those cities which are attempting to sell their image beyond the city walls. This form of urban marketing has always existed. We are referring, rather to the fact that, in certain projects, the metaphor of the city is truly a metaphor, as the virtual city gradually becomes a meeting place for individuals who share common interests without sharing a common place of residence. This phenomenon of transgression of the city's traditional borders, and the creation of new social communities around the urban metaphor, are of particular interest and are opening up promising avenues for future sociological analyses.

We therefore find different types of virtual cities which incorporate, accordingly, the notions of Community or of City: on-line communities, on-line administrations, the development of a city's telecommunications infrastructure, service offerings on the Web, digital cities which are grounded or not depending on whether or not they are linked with a real terrestrial counterpart (GRAHAM & AURIGI, 1997). It appears that certain cities are unable to clearly define their borders, consequently the services they wish to offer and, even more fundamentally, their target audience.

The blueprint model

The blueprint model, which we have also called the control or regulation model, tends to contain or reduce the project's uncertainties. These uncertainties are linked as much with the technical aspects as the content and services, or even the social aspects. In the development of this type of project, everything takes place as if the designers or planners, from the outset, were attempting to confine the project to pre-defined choices, to isolate it from outside interference and from the social reality which would cause it to deviate from the blueprint they conceived.

Several features serve to identify this type of process:

- centralised regulation of development by the designers,
- a clear separation of the designers' and users' roles,

- an absence of involvement on the part of users in the project's design and development process,
- a vision of the project as an integral whole to be mastered from the outset,
- a limited lifecycle for the project: the project has a clearly defined beginning and end,
- the choices are implemented from the start of the lifecycle and are rarely adapted.

This development model closely resembles the classic top-down models found in the development of information systems.

The projects which emerge from this model are either closed projects or projects whose lifecycle appears "confined" by a beginning and end, the delivery of the product or site, which can be clearly identified in a timeframe. Behind this model, we find a goal which is proper to all computer technology development initiatives (EVENO, 1997; LOBET-MARIS, 1991), i.e. that of capturing a complex social reality within a perfectly integrated, mastered and coherent information system.

With respect to the management issues referred to here above, this model offers several solutions. Technological instability, for instance, is managed by technological choices which are highly controlled from the outset, and adapted very little during the project's development. Users are perceived as being an integral part of the information system, as mere information processors who, therefore, are not to be included in the development process. The only confrontation with users intervenes with the project's outcome since it has a clearly defined lifecycle. Lastly, there is little thought given to the city's borders. The cybercity is conceived as a closed space which corresponds to a real city and, more specifically, which primarily involves a local administration.

As with all models, this model is, in essence, a simplified reality; it helps to qualify or to describe certain examples which we have analysed. It can be found in Pèriclès (van BASTELAER, 2000b): a global project for the development of information technologies in a Belgian city or, at the very least, its first phase of development. In this case, it is easy to perceive the concept of the virtual city as a closed information system which is predominantly administrative in nature, accompanied by a desire to control not only the technological choices but also the chat forums, for example, for which the subjects will be chosen in a centralised fashion. This concept and the, no doubt unconscious, choice of the blueprint model are linked mainly to the personality of one of the chief planners. His or her involvement in the

initiative as it developed appears to have enabled the project to evolve toward a greater flexibility.

For GRAHAM & MARVIN (1996), this control is highly present in a number of urban policies regarding telematics. According to these authors, this is due to the fact that politicians and technical experts feel that they have greater control over the environment than they actually do. Graham and Marvin add that this type of controlled initiative is not sustainable as it does not meet users' true needs, and is based too heavily on the optimistic technology push type approach. For KUNZMANN, BRÖDNER & RÜCKER (1998), this classic model of controlled urban development and traditional urban planning is not likely to be able to survive much longer, and they underline the necessity of opting for a more flexible and less co-ordinated decision making process which involves numerous players, including local communities.

The flexible model

Unlike the preceding, the flexible model sets out to manage uncertainties by working on a project which is temporally more modular in nature, and which undergoes changes come from user experimentation with the project, changes which will make it evolve and sometimes deviate from its initial trajectory. We may therefore refer to this as the experimental or adaptive model.

The project's designers here appear as the architects of a social reality which is constructed through users' reactions, and thus in a perpetual state of change. The project's uncertainty is reduced by the fact that the designers do not perceive the project as a product to develop, but rather as an ongoing process of social construction.

Several features serve to identify this second model:

- central regulation of development, performed by the designers,
- a separation of roles between designers and users,
- user involvement, through experimentation, in the project's design and development process,
- a perception of the project as a process of social construction which is open to change,
- an indeterminate project lifecycle: the project emerges as being in a constant state of development,
- flexible technical choices which can be adapted throughout the development process.

The management issues stated above are dealt with in several ways. As was pointed out earlier, users are involved in this project via experimentation. The best way to manage uncertainties appears to imply opting for a flexible framework wherein choices can be adapted when necessary. User involvement is important, and even indispensable, for obtaining information on the required modifications. These changes must be implemented by the designers who thereby maintain a central role in the development process. This central role may be perceived as a role of go between, of cybercity host, endeavouring to federate the various interests. Michel HERVÉ (1997), mayor of Parthenay, underlines the role of the local authority in this type of model. In his opinion, it must serve as a catalyst to citizens' involvement, by offering them support and by facilitating relations between the players. Users must, among other things, master the communications tools and become producers of information, the architects of their city.

The second management issue, in other words technological instability, does not appear to be a problem, at least not for the designers who frequently adapt their choices. Lastly, with respect to the city's border, what emerges is an open view of the city, of the community with flexible frontiers.

In fact, the projects which correspond to this model often have broader ambitions than those of the blueprint model, rendering too difficult, and even impossible, control over each element of the cybercity. It is for this reason, in our opinion, that it is necessary to include, insofar as possible, each player in the social construction process, and to give them an autonomy by allowing or soliciting their participation in the city's construction.

This model was observed principally in Anvers (DMA) and Amsterdam (DDS). De Digitale Stad (DDS) was the first virtual city in the Netherlands, and one of the first in Europe. It was launched in 1994 as a social experiment of pre-determined length (10 weeks) during the local elections (van LIESHOUT, 2000). Belgium's first cybercity, the Digital Metropolis Antwerp (DMA) project, described by PIERSON (2000), while pursuing different goals, was perceived initially as DDS's little sister. In both cases, users, or inhabitants, of the virtual city, took part in the construction of their city by "building" new neighbourhoods, new houses, new flats (this metaphor corresponds to their personal homepage). Technological instability does not seem to have been an issue since, DDS for instance, and notably the sites interface and structure, was considered as a playing field for the designers (van LIESHOUT; FRANCISSSEN & BRANTS, 1998).

Furthermore, DDS and DMA were modified frequently. The interface changed at least four times on both of these sites entailing, each time, a significant structural modification. Certain elements of control were maintained for these projects, particularly at the content level of certain personal pages, chat groups and the establishment of a form of local netiquette (DMA). Lastly, we perceive a very open concept of the city and of the communities which comprise it, with very flexible borders. There are indeed a great many citizens of virtual Amsterdam or Anvers who do not physically reside in those cities.

This model can also be observed in other cases:

- Hampshire & Southampton, notably with respect to an open choice of technology, teamwork and a frequent assessment of the project (CORNFORD & NAYLOR, 1998);
- Lewisham & South East London where one discerns a true desire to have local users involved in a bottom-up approach, albeit with centralised control over development (CORNFORD & NAYLOR);
- in Vienna, where the strategy deployed with regard to information technologies is considered to be relatively flexible, both anticipating and providing for the required technological changes. The choices are made, according to Cornford and Naylor, on an evolving basis rather than by applying a top-down strategy.

Bologna's IperBoIE ⁽⁴⁾ project, which is often cited, is another example of the flexible development model, according to a bottom-up approach, while maintaining certain elements of control. GRAHAM & AURIGI speak of controlled public spaces, of an interactive public service wherein several elements are built by the users. For TAMBINI (1998), IperBoIE falls into a tradition of decentralisation and controlled openness. The local community, Comune, plays a key role. It controls a number of elements, notably in terms of chat forums (the choice of subjects, rules of operation, power to censor, etc.). The separation of roles between the designers and users is very clear, even if users are considered to be important players, a fact which distinguishes this second model from the first.

It was underlined earlier that, in Parthenay, the local authority perceives its role as one of catalyst to social action. Users are seen as players and not spectators. The METASA approach, which is at the basis of the Parthenay's digital city, can by all means be perceived as an example of

(4) Internet for Bologna and Emilia.

the flexible development model, as an innovative social process combining social interaction which integrates social movements and technical demands.

For KUNZMANN, BRÖDNER & RÜCKER, officials hoping to build digital cities must identify, at the foundation level, non commercial organisations and support their initiatives without attempting to dominate them. They share the notion of the local authority as federative, and whose principal objective is to encourage the city's players to collaborate on the project. This point of view is supported by Isabelle PAILLIART (1993) who argues that local agencies must develop a new organisational function which includes the tasks of fostering initiative, of hosting and organising. The local authority must act as an intermediary which facilitates relations between citizens. In Jérôme BARRE's (1995) opinion, local authorities must place themselves openly on the users' side in such a way as to be receptive to their needs, to make these needs known and to federate the development of new uses and applications.

The open model

Lastly, the open or *laissez-faire* model is a model of development which is proper to Internet culture, in other words reflective of a democratic and libertarian spirit (GRAHAM & MARVIN), a technological association and a decentralised medium (KUNZMANN et al), a culture which is allergic to all forms of State intervention (TAMBINI). The freedom of expression and the absence or censorship also contribute to this culture

According to this model, and to the tradition of Internet culture, there is no separation between the project's designers and users: their roles are interwoven. In view of this, then, there exists no central architect. The project is constructed and enhanced through each individual's contribution. Overall regulation of uncertainties is performed in the manner of the invisible hand which regulates markets, in the form of self-regulation undertaken by the users, wherein they adopt certain developments and reject others. Here, as well, the project does not appear to have a determined lifecycle; it evolves continually via the users' actions and interaction.

The principal features of this type of development model are:

- the absence of centralised control over development;
- an interweaving of the roles of designer and user, the users becoming the designers;

- the absence of a global vision for the project;
- a lifecycle for the project which remains indeterminate; it is a collective social construction project in a constant state of evolution;
- no clear or specific choice since no one is ultimately responsible for development.

We have found no real examples of such an open model, although certain cities such as DDS and DMA do present certain elements such as the construction of houses or flats by the inhabitants or the hosting of neighbourhoods, as was mentioned here above. In this model, there is no clear reflection on the management issues encountered, or on the required solutions, given the fact that the cybercity has no central management. Everyone contributes to the city's social construction process.

This concept somewhat resembles the notion of virtual communities, local initiatives based on a new perception of the community: decentralised, interactive, fair-minded, participatory, etc. (GRAHAM & AURIGI). These characteristics can be found in the examples of *Cleveland Freenet* and the *Seattle Community Network* cited by Graham and Aurigi or Santa Monica's *Public Electronic Network* (DOCTER & DUTTON, 1998). According to Cathy BRYAN (1998), *Manchester's Electronic Village Halls* are another example of the open model wherein, at the project's initial stage, existing community organisations were invited to respond to a call to tender in order to obtain financing for the next two years.

These initiatives generally bring to mind, as pointed out by Isabelle Paillart, the development of local community television in the 70s, whose primary goal was to improve local communication and to offer an alternative to mass audience TV. In these projects, television viewers' potentially active role was also a central factor.

A dynamic process

These three models are by no means hermetic, however. On the contrary, in the manner in which cybercities are now being constructed, there exist transitions from one model to another, depending on the project's evolution and the players' will.

Transitions may be made in either direction.

In the case of Anvers (DMA), it is without a doubt the blueprint model which guided the virtual city's initial construction stages. The project

gradually opened itself up to other components of the urban community which therefore required opening the model up to experimentation, and even to a certain laissez-faire, in order to integrate these new components that the initial designers did not master. Hence, in the city of Anvers, certain neighbourhoods were self-managed by the inhabitants for a time. The Pèriclès project, as well, went from a controlled and highly centralised concept toward a gradual opening up to other players.

In other cybercities, such as Amsterdam (DDS), the transition took the opposite direction. While the project was initially community based, managed by the members of various associations, economic needs in particular forced the designers to pursue the project's development in a more controlled manner, with a clearer overall view and certain managerial factors. As with Anvers, this virtual city seems to have now reached a certain balance between a number of clearly managed neighbourhoods and other more open ones, depending on what the inhabitants contribute.

A transition from the first model to the second is no doubt linked to the ability of local authorities to define and take on their new role in local affairs. KUNZMANN, BRÖDNER & RÜCKER also refer to the transition from a controlled model to a more flexible one, wherein the decision making process is less tightly co-ordinated. The cases of Anvers and of Santa Monica's *Public Electronic Network* both illustrate this type of transition. Opening up to new categories of players implies the adoption of a more flexible approach in order to integrate and best manage these new components.

These cases are in fact exemplary to the extent that they appear to have been able to draw upon the various development models according to the manner in which the various players in the urban community interacted, thereby managing to construct a mosaic cybercity, mirror of social reality. This is one of the primary practical implications of these models: the ability to assess the type of model in which one finds oneself and whether its characteristics correlate with the project's goals: user involvement, project flexibility, administration's role, etc. A second implication resides in the manner in which the various pinpointed management issues are dealt with: technological instability, user involvement, the cybercity's borders.

■ Conclusion

Even though Emmanuel EVENO (2000) underlines the difficulties linked with the attempt to establish predominant urban models, and in drawing comparisons between widely divergent virtual cities, it does appear, nevertheless, that through these different development models different sociological concepts of the city do emerge. The term "virtual city" hides a number of clearly disparate social realities, ranging from the City-metropolis focused on the relations between the local government and its citizens and the Community-city which assembles citizens around common themes, with or without physical grounding.

In the first case, the cybercity project appears above all as a project mounted by community officials, whose development often relies on the blueprint model, given that the local authority intends to remain master of its project and its choices.

In the second case, the cybercity aims to mirror the urban community with its multifarious economic, social and cultural components. Such projects are at once ambitious in scope and less easily mastered overall. For this reason, then, they must rely for their construction on permanent interaction with the many players who make up the urban community, and even on allowing them a degree of autonomy in the construction of certain areas of "their" city.